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Ser. No. 10/578,047

**AMENDMENTS TO THE CLAIMS:**

Please replace the claims with the claims provided in the listing below wherein status, amendments, additions and cancellations are indicated.

1-7. (Cancelled)

8. (Currently Amended) An ion beam processing method for changing surface properties of a substrate from a known pattern of properties to a new technically defined pattern of properties, comprising:

positioning the substrate relative to an ion beam that is generated by an ion beam source;

measuring a current geometric action pattern of the ion beam with an ion probe array during processing of the substrate; and

adjusting the geometric action pattern of said ion beam based on the measured geometric action pattern and the known pattern of properties, said adjusting comprising varying local ion current density distributions within an ion beam cross section, thereby causing a corresponding variation of ion energy distribution at defined surface area regions of the substrate that ions of the ion beam act upon;

wherein the current geometric action pattern of said ion beam on the surface of the substrate is measured prior to and/or during the course of said method by the

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ion probe array, which is arranged in a plane of the surface of the substrate to be processed.

9. (Previously Presented) A method according to claim 8, wherein said substrate and the ion beam source rotate relative to one another and/or are moved uniformly or non-uniformly linearly, in a circle, or in a technologically pre-specified direction.

10. (Previously Presented) A method according to claim 8 or 9, wherein said measuring and adjusting is performed for at least two individual ion beams having respective beam characteristics which are controlled synchronously.

11. (Previously Presented) A method according to claim 8 or 9, wherein an angle between a surface normal of said surface of said substrate to be processed and the axis of said ion beam striking said surface is modified.

12. (Currently Amended) A method according to claim [[1,]] 8, wherein said ion beam source is a wide-beam ion source.

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13. (Previously Presented) A method according to claim 10, wherein an angle between a surface normal of said surface of said substrate to be processed and the axis of said ion beam striking said surface is modified.

14-17. (Canceled)

18. (Currently Amended) An apparatus for ion beam processing of a surface of a substrate, comprising:

a substrate support for mounting at least one substrate presenting said surface, said substrate support being disposed within a vacuum chamber and being movable in a Y axis and in an X axis;

an ion beam source being mounted in a wall of said vacuum chamber such that an axis of an ion beam from said ion beam source is perpendicular to said surface of the substrate to be processed in a Z axis or is positionable in an axis that is inclined to said Z axis, such that a distance from said ion beam source to said surface of said substrate to be processed is fixed or variable;

an ion probe array arranged in a plane of the substrate surface and positioned to measure a current geometric action pattern of the ion beam; and

means for adjusting the geometric action pattern of said ion beam prior to and during said ion beam processing of said substrate surface based on the measured geometric action pattern and a known pattern of properties of the substrate surface,

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said adjusting means varying local ion current density distributions within an ion beam cross section, thereby causing a corresponding variation of ion energy distribution at defined surface area regions of the substrate that ions of the ion beam act upon.

19. (Previously Presented) An apparatus according to claim 18, wherein said ion beam source is formed from at least two individual ion beam sources, the individual ion beams of which form a common current geometric action pattern of said ion beam on said surface of the substrate.

20. (Previously Presented) An apparatus according to claim 18, wherein said ion beam source is a wide-beam ion source.

21. (Previously Presented) An apparatus according to claim 18, wherein the ion probe array is arranged in a plane of the surface of the substrate to be processed.

22. (Previously Presented) A method according to claim 8, further comprising:

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producing a geometric action pattern at the substrate surface by varying ion acceleration, ion energy distribution, ion current density, and ion density distribution of the ion beam; and

wherein said adjusting the geometric action pattern is performed as a function of the known pattern of properties, the method progression, and the current geometric action pattern of the ion beam to achieve the new technically defined pattern of properties.

23. (New) An apparatus according to claim 18, in which said adjusting means varies ion acceleration, ion energy distribution, ion current density, and ion density distribution of the ion beam to achieve the adjusted geometric pattern.